

CLAIMS

What is claimed is:

1. A fuel supply and diagnostic module comprising:

a fuel system including a fuel pump assembly in fluid communication with a fuel tank to supply fuel to a vehicle engine, a fuel level sensor assembly for measuring fuel levels within the fuel tank, and a leak detection assembly for detecting fuel system leaks;

and

a fuel system control unit that includes controls and diagnostics for said fuel pump assembly, said fuel level sensor assembly, and said leak detection assembly wherein said fuel system control unit cooperates with an engine control unit to provide fuel to a vehicle engine.
2. The module of claim 1 wherein said fuel system control unit is separate from the engine control unit.
3. The module of claim 2 wherein said fuel system control unit is electrically connected to the engine control unit with only a two-wire connection.
4. The module of claim 3 wherein said 2-wire connection includes a communication protocol comprising a controlled area network.

5. The module of claim 1 wherein said fuel pump assembly, said fuel level sensor assembly, and said fuel system control unit are assembled as a sub-module with said sub-module being installed at least partially within said fuel tank.
6. The module of claim 5 wherein said leak detection assembly includes at least one detection component mounted separately from said sub-module and wherein said detection component includes a single wire connection to said fuel system control unit.
7. The module of claim 1 wherein said fuel system control unit generates a fuel pump control signal for controlling operation of said fuel pump assembly, a fuel pump diagnostics signal, a fuel level sensor signal corresponding to a current fuel level, a fuel level sensor diagnostics signal, a leak detection hardware control signal for controlling operation of said leak detection assembly, and a leak detection diagnostics signal wherein said fuel pump diagnostics signal, said fuel level sensor diagnostics signal, and said leak detection diagnostics signal are communicated to the engine control unit.
8. The module of claim 1 wherein said leak detection assembly comprises an evaporative natural vacuum system.
9. The module of claim 1 wherein said fuel system control unit remains active after the engine is turned off to operate said leak detection assembly while the engine control unit remains inactive after the engine is turned off.

10. The module of claim 1 wherein said fuel system control unit includes a power supply unit operably connected to a vehicle battery.

11. A method for supplying fuel and generating fuel system diagnostics for a vehicle engine comprising the steps of:

- (a) generating engine control signals from an engine control unit;
- (b) generating a fuel pump diagnostics signal and a fuel pump control signal to provide fuel to a vehicle engine;
- (c) generating a fuel level sensor diagnostics signal and a fuel level sensor signal corresponding to a current fuel level;
- (d) generating a leak detection diagnostics signal and a leak detection hardware control signal for controlling operation of a leak detection assembly; and
- (e) generating the signals of steps (b) through (d) from a common fuel system control unit that operates independently from the engine control unit.

12. The method of claim 11 including the step of connecting the fuel system control unit to the engine control unit with a 2-wire connection.

13. The method of claim 12 including the step of providing a controlled area network communication protocol via the 2-wire connection.

14. The method of claim 11 including the steps of assembling a fuel pump, a fuel level sensor, and the fuel system control unit to form a sub-module and installing the sub-module at least partially with a fuel tank.

15. The method of claim 11 including the steps of maintaining the fuel system control unit in an active mode after the vehicle is shut off to detect fuel system leaks and deactivating the engine control unit when the vehicle is shut off.